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ABSTRACT

This paper reviews empirical findings from recent social impact assessments (SIAs) conducted in Arizona, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Utah, and Wyoming where energy development occurred in the 1970s and points out efficient research strategies for policy decisions. Topics covered by the SIAs include characteristics of itinerant workers, attitudes of oldtimers/newcomers toward development, and effects of development on local economies, small businesses, financial institutions, community services, social well-being and social and political structures. Ecological, ethnic, and historical characteristics of the western energy states are reviewed and the energy boom of the 1970s is shown to be consistent with the region's historical boom-bust pattern. Identified as research needs are comparative community studies clarifying why development inputs have different effects from community to community, time-series community data to explain the process of social organization/disorganization, and methodologically appropriate analyses addressing changes in individual and community well-being. Other recommendations include the recognition of a sociology of arid/semi-arid regions and the need for research to be thoroughly grounded in historical patterns of social organization and physical and cultural characteristics of the region. Studies are suggested to identify and measure key social elements and to investigate the social welfare of itinerant workers. (LFL)

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Contributions Toward A Conceptual Framework for Social Impact Assessment in Semi-Arid Lands of the Western United States

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I. INTRODUCTION

The recent decline in the rate of energy development in the Western energy states [1] provides an opportunity to assess the accomplishments of social impact assessment research in this region and to chart possible courses for this effort when, and if, development increases again. It appears likely, given historical trends in the region and the growing dependency on fossil fuels in many nations, that energy activities will increase again, dramatically and suddenly as they did in the past decade. On the other hand, an increase may not come again for decades, given the state of international energy markets today, unless some catalyst stimulates demand for energy resources. In either event from the long-term view, with or without another energy boom, the need to know about this region and its peoples remains with us.

The intent of this report is to suggest a conceptual framework which could help focus social impact assessment (SIA) work in this region. The authors believe that the Western Social Impact Assessment (WSIA) effort would benefit from incorporating a greater awareness of the ecological and historical characteristics of the area. We begin by presenting a brief review of ecological, ethnic and historical characteristics which we believe are essential to understanding social change in this region.

We then review empirical findings from several recent social impact studies completed in the region. We focus on 'social' impacts especially those studied in sociology. Rather than addressing

structural and policy questions which determine how social impact assessment (SIA) is done, or how such results are used, the report focuses on empirical results of social impact assessments.

II. CHARACTERISTICS OF THE REGION AND OF RECENT ENERGY DEVELOPMENTS

An understanding of the natural ecology of the West, and of the varied success human groups have experienced in adapting to the habitats of the region is critical for specifying community changes accompanying energy development.

The geographic area which encompasses the Western Energy Region is both varied and vast. The eight state area discussed here reaches from the Missouri River Valley in the east into the Great Basin area in the west and ranges north and south between the Mexican and Canadian borders. These states encompass five major geographic areas, each with contrasting ecological characteristics. From east to west, these include the humid Central Lowlands, the Great Plains, the Rocky Mountains, the Colorado Plateau and the Great Basin. However, the preponderance of energy development has been concentrated in the Great Plains and the Colorado Plateau. For purposes of this report, the Colorado Plateau and the Rocky Mountain area are combined into a region labeled the "Mountain Area". The other major area under consideration is, of course, the Great Plains. These three areas are shown in rough detail in Figure 1.

Following Webb (1931), we define the eastern boundary of the Great Plains as the 98th meridian and western boundary as the eastern foothills of the Rocky Mountains. The "Mountain Area" extends from the western edge of the Great Plains into central Utah to the eastern edge of the Great Basin.

Figure 1: Western Energy Area

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The most problematic feature of both the Mountain Area and the Great Plains, is their semi-arid climate. Semi-arid does not mean that the area is half wet and half dry each year; it means instead that some years are dry, almost arid, and others are wet, sometimes very wet. Compounding the difficulties of irregular precipitation patterns are sharp, rapid temperature variations. But it is this unpredictable, irregular precipitation pattern that is a key ecological factor in much of the West and Great Plains areas (Kraenzel, 1955).

The Mountain Area is very similar to the Great Plains in the overall ecological challenge it poses to man. The climate is arid to largely semi-arid, but the temperatures are cooler and the topography is decidely uneven. Elevation and considerable forest cover, however, serve to retain moisture and provide some naturally irrigated areas. These conditions have resulted in a spotty or island-like distribution of agricultural settlement. The Mountain environment has traditionally provided a more diversified economy than the Plains; it is based on ranching, timber, mining, some farming and tourism. However, the climatic similarities of the two areas and resultant population sparsity have produced similar social adaptation problems and issues. Thus, our discussion focuses on the more problematic Plains Area with comparative references to contrasting conditions and solutions of Mountain Area residents where appropriate (Kraenzel, 1955).

Plains Inhabitants

Through an assessment of Great Plains wildlife and vegetation, including the coyote and bison, Kraenzel develops a thesis that is useful in energy-development research. He observes that the adaptation of all life forms to the Great Plains is based on possession of at least two of the following three qualities: flexibility, mobility, and reserve capacity. He argues that successful human adaptations have been based on institutions and social organization patterns with these same qualities (Kraenzel,1955).

The Indians were perhaps the human group that most fully adapted to the Great Plains, if one follows these criteria and accepts subsistence as evidence of adaptation. Curiously, this adaptation involved several tribes who had previously evolved an agricultural subsistence pattern, but reverted to a hunting pattern when they migrated into the Great Plains from the forested Great Lakes region. Plains tribes include some of the best known tribes in American history, e.g., the Pawnee, Cheyenne, Commanche and Crow Indians.

Indian institutions reflected the constraints imposed by the Plains environment, thus, exhibiting the qualities of mobility, flexibility and reserve capacity. These adaptations included a nomadic subsistence pattern, principally hunting, which often centered around the migratory patterns of the bison. The Indians developed weapons adapted to big game and domesticated beasts of burden for transportation--first the dog, and later the horse, adopted from the Spanish settlers. They also developed food storage techniques,

housing technologies and a division of labor especially suited to their mobile hunting lifestyle (Kraenzel, 1955).

Likewise the Ute, Wind River and Flathead tribes developed institutions suited to their mountain habitat. Again they were primarily hunting tribes, although they exhibited less mobility than the Plains Indians because of relatively greater dependence on game with shorter and/or more predictable migratory ranges, e.g., elk and deer. The adaptation of the Indians to the region failed ultimately, not because of internal stresses on social organization, but because of invasion of the area by other groups.

The next human invasion of the Plains was by the Spanish, beginning in the mid 16th century, followed by the French and British in the 18th century. The interests of these groups were primarily missionary work, trade, and resource exploitation.

The last to enter the Plains were the Americans. Like the French, Spanish and British before them, Americans began their venture into the Great Plains and Mountain Areas in order to map the area and to locate natural resources. Following the Louisiana Purchase in 1803, several expeditions were launched. These included the Lewis and Clark expedition (1804-1806), the Zebulon Pike expedition (1806), and Stephen Long's Yellowstone expedition (1820). However, the reports of these expeditions confirmed, if not established, a basic bias in the public perception of the Plains as being unsuitable for agriculture. Long, in fact, dubbed the area "the Great American Desert". This left an enduring impression that the Great Plains were to be crossed or exploited, but not inhabited.

The first Americans to inhabit the area permanently were cattlemen, followed by sheepmen. The history of the stockman's occupation of the Great Plains reflects a way of life that was in some ways remarkably well adapted. Their predominance on the Great Plains lasted from the Civil War to about 1900. The era was initiated by Texans who adopted species of both cattle and sheep, plus techniques for handling stock from the Mexicans. These innovations gradually diffused over the entire region. The patterns consisted of controlling herds from horseback, trailing cattle from one grazing area to another and following the seasons and trails to market depots. Mobility and flexibility were at the heart of these adaptations. For example, the proverbial ranch house was really only a base of operations located near a source of water. The grazing territory, known as "customary range", was often not contiguous with the ranch house grounds, and the concept of ownership was scarcely recognized. "Customary range" was acquired through "appropriation" via public notice in the nearest newspaper. Control and enforcement of range rules were accomplished through creation of stockmen's associations.

Eventually a combination of foreign speculation, overstocking of the range, falling prices, and a gradual intrusion of farmers fostering concepts of fencing and ownership led to drastic reductions of the cattle industry. The gradual establishment of public domain grazing helped salvage some of the industry (Kraenzel, 1955; Bennett, 1969).

Farmers were the last group of settlers to move into the Great Plains, but until about 1880 they hesitated along the 98th meridian.

Part of the reason is that this was the perimeter of Indian territory, but the critical factor was the perception that the area was environmentally inhospitable. Despite offers of largely free homesteads, the region appeared to lack even the basic ingredients for survival familiar to the East, e.g., trees and stones for building homes and fences. Gradually the region became more attractive as transportation and communication systems were established and with the invention of barbed wire fencing, windmills, sod houses and the heavy duty farm implements that made agriculture feasible (Kraenzel, 1955).

Between 1870 and 1910 the Great Plains became an agricultural province cultivated by both American and European immigrants. Almost as quickly, periods of pestilence and drought produced intermittent waves of outmigration. This pattern of population and depopulation has continued to the present (Kraenzel, 1955; Bennett, 1981).

World War I produced the first major period of prosperity in the Great Plains, but also led to an over-expansion of agricultural activity. Overproduction, extensive use of heavy machinery, drought, and the failure of Eastern financial institutions combined to produce massive problems, e.g., dust storms and the Great Depression, that lasted through the 1930's.

To make matters worse, the increasing rationalization and mechanization that had been viewed by many as the salvation of agriculture, created negative social effects in rural America that were magnified in the Great Plains. Between 1920 and 1970 the population of rural areas and small villages (under 2500) on the Plains dramatically declined in response to depression and subsequent

capital intensive remedies employed in agriculture. In an area already troubled by sparse population, this left vast areas too sparsely populated to comfortably support many institutions necessary for meeting human needs such as health, educational and recreational organizations. This phenomenon has been referred to as the "social cost of space" (Kraenzel, 1955), and continues to be a problem today, one that is often incorrectly attributed solely to the advent of energy development.

Unsuitable Institutions Under Sparse Settlement Conditions

The origin of many social problems in the Great Plains can be traced to the adoption of Eastern institutional practices that while suitable for the humid areas of the East, were, and are, unsuitable for the semi-arid West. The crippling effects of these institutions appear to be centered in governmental and financial institutions.

The first appearance of these maladaptive institutional practices in the region's governmental institutions can be traced back to the constitutions most Great Plains states adopted. Many states used virtual replicas of documents developed for Eastern states. These documents showed little appreciation for the problems of sparse settlement, the need for financial reserves in government and the need for mobility, flexibility and reserves in agricultural and business enterprises (Kraenzel, 1955). There are, of course, variations in the extent to which institutional models have been modified to reflect actual conditions. The point is best evidenced in government institutions adopted by states on the eastern side of the Great

Plains, e.g., the Dakotas, which are influenced by the township form of local government prevalent in New England. Counties are relatively small in this portion of the Great Plains, and the township with it's emphasis on participatory democracy prevails. Unfortunately, this is an expensive form of government because there are often paid officials as well as separate services in each township of a county. To complicate matters, there are inequities in the tax base of this system because some townships contain properties of high assessed value, while others lack commercial property and the burden of government services is disproportionately borne by private citizens.

On the western edge of the Great Plains the model for local government has been borrowed from the Old South and the arid West and is tempered by the Spanish influence. The result has been a form of government in which the county is the dominant unit of local government. The counties are relatively large, allowing for economies of scale and a more even distribution of costs and benefits in the sparsely populated region. The county form of government is also generally cheaper because it means fewer paid officials in relation to the population base, and fewer units of government providing the same services.

Land and credit policies are among the most glaring examples of society's failure to grasp the significance of the unpredictable climate of the Great Plains, especially in terms of income effects (Bennett, 1969). Credit policy utilized on the Great Plains is clearly a humid area instrument. An adaptive credit policy for the Great Plains would take into consideration the unpredictability of

climatic characteristics. Instead, rigid repayment schedules that do not permit postponement of repayment under conditions of income loss due to climatic forces has prevailed. Mortgage foreclosure policy likewise has generally not made provisions for conditions of failure that are not a function of the behavior of the operator. Federal sources of credit have generally been the only sources allowing sufficient flexibility of payment. The results have been frequent financial failure and outmigration (Kraenzel, 1955).

Building viable community social organization utilizing unsuitable concepts has been difficult. But, by virtue of modifications that have occurred, particularly in segments of the western portion of the Great Plains and the Mountain Area, together with diversification in the economic bases of a few areas (e.g., mining, lumber) some communities have proved to be quite resilient. In the case of mining and lumber industries, community life was often based on paternalistic institutions totally intolerable to many Americans. Indeed, adaptation often has required concepts that seem quite alien elsewhere in the nation (Allen, 1966).

Obviously, an adequate understanding of the social organization of any community will have to include documentation of historical changes, particularly those of recent history. Several innovations, including agricultural and electric power cooperatives and the Western Interstate Commission for Higher Education, emerged during the 1960s and 1970s and in varying degrees have contributed to the adaptation of plains and mountain communities. During the late 1970s and early 1980s, there emerged still another institutional form in conjunction

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with energy development--direct private sector fiscal assistance to localities. Rapid energy-related growth has created social problems in the West because ill-adapted forms of government in the region are typically deficient in reserve fiscal capacity. Development has set in motion a struggle to meet human needs in the affected localities that has culminated in the partial institutionalization of advance direct fiscal and planning assistance to localities to meet needs until lagging mineral based revenue finally arrive. Mitigation agreements made in conjunction with the Laramie River Station in Wheatland, Wyoming provides an example of these arrangements. The long term adaptive value of such approaches is still in question. In any case, the presence of these recent institutions and the degree of influence on communities in the region is uneven; they must be identified and their effects carefully measured in order to properly discern the effects of energy development (Kraenzel, 1980; Bennett, 1969).

While this discussion of the region is entirely too brief, it serves to illustrate several general principles which should be reflected in WSIAs. First, the condition of semi-aridity creates a need for social organizations and institutions suited to these climatic conditions. There have been several attempts to develop a sociology of arid lands (Knowlton, 1964; Bennett, 1981), and this effort is experiencing a resurgence of interest today. Unfortunately, the sociology of arid lands is still in its infancy. But the Western researcher needs to be alert to the history of social organization and change in the semi-arid and arid West, and, therefore, careful to

ground observations and conclusions thoroughly in this history, being careful not to adopt uncritically, explanations and facts derived in more humid regions.

Second, it is well documented that the West is a mosaic of ethnic cultures, primarily Indian, Spanish, Mexican-American, and Anglo, and that each of these cultures has evolved particular institutions and organizations in response to the climatic conditions--similar to one another but with important differences. The subtleties of these differences needs accurate recognition.

This eight state region is composed of a surprisingly large number of ecologically and culturally distinct sub-areas. Thus, for example, the effect of a particular development project in Colstrip, Montana is likely to be very different from its effect in Washburn, North Dakota or Gallup, New Mexico. It is clear that more empirical case studies are needed, but future community studies need to be conducted with sensitivity to the physical and cultural characteristics of the region.

Recent Energy Developments

Energy development in this region during the 1970s was stimulated by two major forces. One was increased demand for electric power in large cities of the Western states and in smaller communities of the Great Plains and Rocky Mountain regions. The other was a change in market prices for fossil energy. Large power plant projects which were planned for this area in the late 1960s were, in most cases, designed to use coal because of growing concern about the future

availability of petroleum. This stimulated increased coal production prior to 1973, the year frequently designated as the beginning of the "energy boom" in the West. The major event of that year, from the standpoint of energy development, was the sudden increase in petroleum prices. This made production of crude oil and natural gas in the Western states even more attractive to investors than expanded mining of the extensive deposits of coal.

Dramatic increases in construction, mining and related industries occurred because of large energy development projects, principally in six states - Arizona, Colorado, Montana, North Dakota, Utah, and Wyoming. The magnitude of the Western "energy boom" in these states during the 1970s is shown in data from the U.S. Department of Energy, the National Coal Association, and the American Petroleum Institute. Power plants with a capacity of greater than 200 megawatts were under construction in 18 counties, often in plants comprised of three or more units and exceeding 1,000 megawatts in capacity. Annual coal production, mainly bituminous, increased by 336 percent during the decade in these states, from 47 million tons to 205 million tons. Crude petroleum production increased by about 100 percent during the first five years of the decade, and the number of new wells drilled each year continued to grow - from 3,407 in 1971 to 6,378 in 1980 (87 percent). Employment in energy-related industries and in secondary industries stimulated by energy development increased accordingly, and large increases occurred in population.

Energy Development Inputs at the Local Level

Growth of employment and population occurred in the region as a whole because of the large energy development projects, but the greatest social impacts were in small communities in the essentially rural areas near the project sites. Many of these had experienced modest booms and busts in previous decades but few had experienced the magnitude of the growth that occurred in the 1970s. Emery County, Utah, for example, had been a mining area since the early 1900s but had grown only slightly in population since the 1920s; during the 1970s, its population grew by 123 percent. Dozens of towns in the region grew by this much or more.

The immediate impacts on small communities near large projects, especially near large plant construction projects, were of five types, namely: 1) more jobs; 2) more people; 3) more money; 4) increased demand for services and facilities; and 5) increased local presence of large energy development firms with extensive contacts with the outside world. Jobs on large projects attracted literally hundreds, and often thousands, of workers, frequently in successive phases. Other workers, often as many as three times those attracted by basic industries, arrived to take jobs in services and other secondary job sectors. Growth that was due to expanded employment created greatly increased financial resources - and multiplier effects - in local economies, though not always of the magnitude expected. "Drainage" of the local economic benefits of development occurred in some communities for a variety of reasons. One was the tendency for national chain stores to "invade" the local market area, another was

the tendency for the payrolls to be spent outside the community by workers. Obviously, there was great variation in the immediate economic impacts of development on communities.

The entry of large energy development firms into local communities presented an important source of variation. These firms differed greatly from one another in corporate philosophy and experience in managing growth in small communities. In some instances large companies simply avoided taking responsibility for planning and for mitigating impacts. In others, specialists in community development were sent in to work with local leaders and to share knowledge about problems and solutions.

These local inputs--jobs, people, capital, demand for services, and corporate presence--were all highly variable. Likewise the community settings for projects varied widely in history and resources. A complex matrix for estimating the effects of energy development emerges even if only these two sources of variation--the immediate inputs and the community setting--are considered.

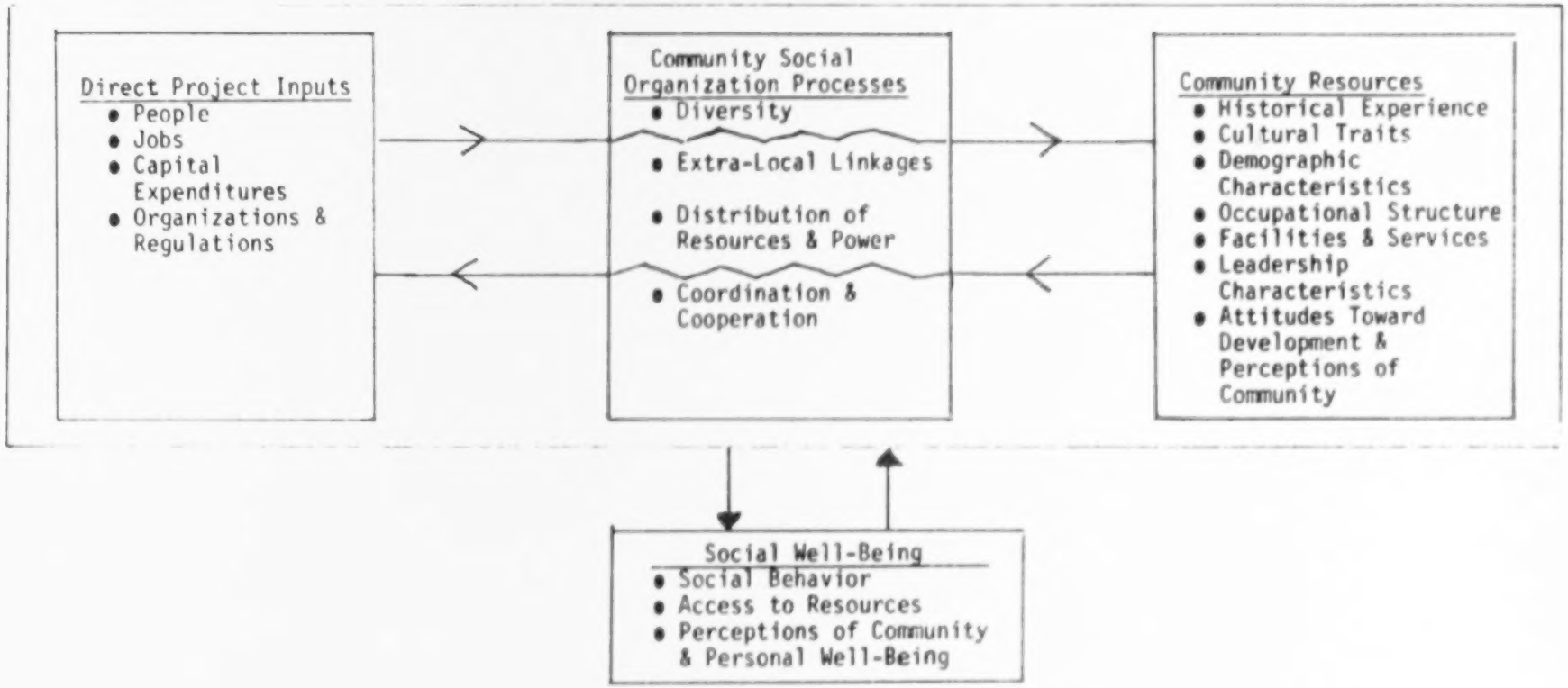
Furthermore, while the aggregate level of energy development in the region has been significant, the dispersion of development over the region has been highly uneven. In addition, the level of development even in those counties hosting development varied greatly (Thompson et al., 1982). Thus, analysis of development needs to be placed in proper historical perspective. From the local viewpoint one development project can appear omnipotent. But from a regional historical view, it is unlikely that energy development did little more than create perturbations in social trends that have continued

relatively unabated since the 1800s--this continuity is probably true even in most communities hosting large projects.

III. SUMMARY OF RESEARCH FINDINGS

As the preceding suggests the interaction of the physical environment of the region, the culture and history of local communities and the inputs of development projects creates a complex matrix of possible effects. Figure 2, adapted from the Guide to Social Assessment (1984), is presented as a simple conceptual model to illustrate the major components which need to be considered in analyzing the social effects of development. As the figure suggests, the physical environment and historical and cultural characteristics of an area constitute the pre-impact situation which is altered by basic inputs resulting from any major development. The interaction of these two components, the inputs and the existing community characteristics, are then moderated by the social organization of a local community, which is depicted in Figure 2 by four basic social organization processes--diversification, extra-local linkages, stratification, and integration. The interaction of these three elements then produces effects which are represented as changes in the well-being of the community or of individuals in the community. The community organizational element in Figure 2 could be described in terms of organizational structures as well as the four processes used here. The four processes are used to emphasis the need for change analysis. These four processes are used widely in sociological literature and, thus, suggest links to other studies conducted in different contexts.

Figure 2: The Socioeconomic Assessment Model



Source: Adapted from the Guide to Social Assessment, 1984

For the following summary of social effects we have drawn upon three principle sources: the summary report of ten case studies conducted for the BLM Social Effects Project (Thompson et al., 1982); a series of articles prepared by the authors for a project entitled "A Comparative Study of Change and Disorganization in Energy Development Communities of the Northern Great Plains", sponsored by the U.S. Geological Survey (the USGS Project) (Wilkinson et al., 1983a; Wilkinson et al., 1983b; Wilkinson et al., 1984; Reynolds et al., 1984; Thompson et al., 1983; and a number of studies from the WSIA literature reviewed previously by the authors (Wilkinson et al., 1982a). These sources certainly are not exhaustive of the WSIA literature, but we believe they identify most major social effects which accompany energy development in the region.

Ten Case Studies (BLM, 1982)

The following summary of social effects is taken primarily from the BLM Summary Research Report (Thompson et al.,1982). The ten case studies and the resulting summary report were components of the BLM Social Effects Project which was sponsored by BLM to produce a guidebook for conducting social assessments for use by that and other federal agencies in the Department of Interior. The guide was subsequently published as the Guide to Social Assessment (Branch et al., 1984). A complete description of the ten case (community) studies is included in the Summary Research Report (Thompson et al., 1982).

The following results are summarized in terms of major social, economic and political effects. As stated in the introduction this review is concerned with social effects, therefore, even though we use the terms economic and political we limit the review to the social aspects of these processes. After summarizing major effects occurring in these three areas we discuss some of the problems inherent in assessing social well-being in the Western context.

A. SOCIAL EFFECTS

1. The Distribution of Social Effects Among Community Groups

Previous studies have suggested that energy impacts are negative for the elderly, people on fixed incomes, minority groups and school age children. There is little evidence, however, that energy development is particularly or consistently negative for any of these groups. There is evidence of variance in the level of effect between communities and of specific ways in which some of these groups are differentially affected.

Elderly people on fixed incomes or with few resources appear to be vulnerable during rapid change, but the situation varies from community to community and among individuals. In two communities (BLM, 1982), senior citizens' housing was built and the managers had difficulty finding people with sufficient need to qualify for the housing. Welfare agencies were not able to identify any elderly who were disadvantaged because of the growth. Those who qualified and moved into these housing developments reported a high level of satisfaction and support for growth.

In another community, senior housing (Thompson et al., 1982) was also built and it was reported that those who moved benefited. But a number of elderly citizens did seek counseling, and welfare agencies reported some cases where elderly people on fixed incomes needed assistance because of increased prices and higher rents.

No serious negative economic effects were noted for minority groups in any of the study communities in the BLM study (Thompson et al., 1982). In two communities, Mexican-American workers inmigrated, apparently raising both the income level and social status of these groups through upward occupational mobility. In another, Mexican-Americans reported benefits from the increased social diversification brought about by growth which resulted in greater social opportunity and increased tolerance of social differences. In a third, community mental health workers noted strong economic benefits but high cultural conflicts, personal and familial stress, and disorientation among Native Americans and Spanish land grant residents participating heavily in energy development employment.

Many parents expressed concern about the effects of rapid growth on the school system, but, interestingly, few teachers or students appeared to share this concern. Educators reported varying levels of drug problems in the schools, but few were willing to say drug usage resulted because of growth. Rather, most respondents felt the trend toward drug usage was a national phenomenon that would have appeared in their schools anyway.

The one group of school children who appear to be having educational problems were the children of mobile construction workers

and itinerant oil and gas workers. School officials reported high incidences of learning disabilities and an overall lower achievement level for this group. (These mobile populations do represent some severe impact problems and are discussed in a separate section below.)

Whether or not particular social groups suffer negative impacts is highly variable between communities. It appears that the effects of growth are highly dependent on the social organization of a community, and the philosophy and actions of developers. If a community has a history of good cooperation/coordination (integration) and the developer is cooperative, it appears negative affects for specific groups can be minimal. Lacking these characteristics, the probability of negative consequences is greater, but will vary from situation to situation.

2. Changes in Lifestyle

The following general observations are derived from the case studies:

a. The permanent operating employees of large projects often may have more leisure time than indigenous residents. Greater leisure time often is translated into a greater variety of social activities.

b. Permanent workers often have more personal disposable income than local community residents. This influences what they do in their spare time, sometimes creating new business markets, and frequently placing more demand on formal leisure/social activities which cost money.

c. Significant increases in population size can result in a variety of new social and recreational interests, i.e., new special interest groups, religious groups, recreational organizations, and hobby groups.

d. The presence of shift work often signifies a major change in community activities. If shift work forces are large enough, facilities and services will appear in conjunction with work shifts. There may be more all-night convenience stores, religious and recreational organizations may provide alternative hours of service.

e. The change from particularistic to more universalistic criteria in making a variety of social and business decisions appears to take place where population growth is large. Criteria used in making financial loans, selecting membership in private clubs, and other decisions involving social status and prestige may undergo change.

f. The most significant differences in lifestyle appear to be between highly mobile workers and their families and all others. Actually, differences in values and lifestyles between most new permanent residents and older residents do not appear large, in part because many newcomers apparently are native to the region.

However, the structure of life for highly mobile people does create major differences in lifestyle. These differences are discussed more fully below.

3. Negative Effects for Itinerant Workers

Mobile construction workers are mentioned in several of the preceding discussions. Many pertinent issues related to impact from energy development involve itinerant workers. The term itinerant indicates workers for whom moving is an occupational characteristic; movement from location to location is necessary for employment. Knowledge of this social group is essential to understanding the social effects of energy development, yet we find very little about them in the WSIA literature. Because so little is known about this group we emphasize that the following discussion is suggestive, not conclusive.

Functioning within a framework of long term mobility suggests that the basic social processes of living will be different from those who are less mobile. The processes involving child-rearing, schooling, courtship and marriage, personal and family finances, and recreation are likely to be structurally different for people who move constantly, implying differences in lifestyles, values and social behaviors and attitudes.

These issues--differences in lifestyles, conflicts of values, and disruptive social behaviors--are some of the more common concerns about development. Where we saw evidence of the salience of these issues, mobile workers were almost always involved. We suspect that permanent workers in energy are much like indigenous residents; the structural process of their lives closely resembles that of locals. It is the itinerant worker who appears to differ significantly.

Any sound conclusions about the social life of an occupational group requires extensive study. However, based on our limited observations in the field we offer the following tentative descriptions of issues related to itinerant workers:

a. If there is an education problem in growth communities, it probably involves the children of mobile workers. Frequent enrolling and withdrawing from school systems is disruptive, and children who move from school to school may be more likely to have learning problems.

b. The marriage and divorce structure for mobile workers is probably less conventional. Living together without the sanction of marriage is more normative, and divorce or separation is more common.

c. Personal and family financing is built around irregularity of paychecks. Thus, different patterns of consumption and saving should emerge.

d. A variety of social behaviors viewed as deviant, or even criminal, by less mobile populations may be seen as normal and functional by highly mobile groups.

The differences between itinerant and non-itinerant populations can be extensive. These differences need to be better understood and their implications for social change need to be realized. A matter of crucial importance is that itinerant workers and their families may be the most victimized group when energy development occurs. If we are correct, this victimization occurs, at least in part, because

itinerant workers are disenfranchised members of society in crucial and important ways.

In our complex and highly organized society, access to and acquisition of basic resources needed to maintain a certain quality of life are assured by an individual's membership in an organizational and/or community structure. Permanent employees of companies are usually assured of some reasonable level and quality of housing because of the efforts by the company, the organization who both claims and controls them. Other permanent employees not associated with large organizations are members of local societies. They and the groups to which they belong participate in local political and social organizations through which the negotiation process of acquisition and maintenance of necessary resources is carried out.

In the case of itinerant workers, however, these individuals are often not members of an occupational organization nor are they members of any local community because of their high mobility. (Even if itinerant workers are union members, this is only a partial remedy of the disenfranchisement described here.) Therefore, these individuals are poorly represented in the structures and processes which distribute resources and, as could be expected, they appear to be significantly victimized. They are seldom provided adequate basic resources such as housing, medical care, and education, or they are provided these resources only at an exorbitant price and in a highly unreliable manner. Predictably, we found members of this group to be disillusioned, angry, and frustrated. If construction workers are unionized, many of these problems are minimized if the union is active

in getting resources for its members. But many of the energy projects in the West use non-union labor.

Interviews with permanent residents confirmed that itinerant workers are not accepted members of the community. Only after being pressed by the interviewers did most residents realize that they, in fact, knew almost nothing about these workers even though these workers physically occupy their communities for periods of several months to several years. It also became apparent, particularly in interviews with city officials, that there is often little desire to provide resources, particularly housing, for itinerant workers. The reasons for this ranged from the economic problems of providing temporary housing accommodations to not wanting to encourage such "undesirables" to remain in the community.

It is evident that frequently neither local communities nor major organizations claim these itinerant workers as members. This unique situation has a manifest negative effect on all of the groups involved--the energy companies, the local community, and the itinerant workers themselves. Given the amount of personal and social disorganization that appears to exist among the itinerant workers, it hardly seems plausible that the productivity of these workers could be efficient. The cost of this inefficiency is avoided by companies either by paying low wages or by passing along the cost to the public in the form of unnecessarily high prices. Further, it appears that many of the problems associated with energy development stem from the behavior of itinerant workers, and are the kinds of problems likely to be identified by residents as the most undesirable aspect of

development. However, the community's participation in the process of disenfranchising this social group must cause at least some of the social disorganization problems of these workers which the local community finds unacceptable.

This structural situation is undesirable from both a social and public viewpoint. It is also a problem which is likely to be compounded as energy development continues in Western areas; the number of itinerant workers required in the West may increase dramatically, and the type of people coming in to take these itinerant jobs is changing because of economic conditions in other parts of the country.

Our interviews revealed that workers from other industrial sectors and geographical regions of the country are coming in considerable numbers to seek employment. These new recruits, who come from the timber industry in the Northwest and the manufacturing industry in the Midwest, among others, have expectations of receiving adequate basic resources. Formerly, they were members of an occupational organization and were permanent members of local communities, with both relationships assisting them in obtaining basic resources. The anger, disillusionment, and frustration of the itinerant families we interviewed was extensive. They did not understand much about the local community, having only recently arrived, but they were certainly angry about what they perceived as an unjust and exploitive attitude of both local community members and of companies.

4. Attitudes of Both Oldtimers and Newcomers Toward Development

Few quantitative measures of attitudes are available, however,

field researchers recorded their impressions of major attitudes for the BLM study when they were relatively apparent. Some of the major observations reported included:

a. In nine of the ten study communities, a majority of local residents appeared to support development. In most of the communities, environmentalists, agriculturalists and a variety of interest groups were concerned about specific aspects of a project.

   Structured attitude surveys were available for four of the BLM study communities and provided further evidence that a majority of residents welcomed development. Interestingly, newcomers probably don't differ much from oldtimers in this respect.

b. A significant number--sometimes a minority, sometimes a majority--of agricultural people opposed development in most, if not all, of the ten study communities.

c. While a majority of local residents generally support development, nearly everyone worries about the social problems development brings; most people are highly aware of "boom town" possibilities.

   In the study communities, almost everyone perceived at least some increase in crime, even though perceptions varied on this issue.

   A number of problems occurred during the peak growth periods in practically every community. Most people, old and new residents alike, would agree that housing shortages occur,

prices rise to some degree, and a host of social problems do increase. But few people were so annoyed by such problems that they would oppose development.

d. Concern with environmental effects was widespread among all groups. Several energy company employees reported they had filed complaints against their employers for violating pollution laws. A majority of people in all the study communities appeared to be concerned about maintaining a clean, unpolluted environment.

e. The largest attitude differences are between highly mobile workers and all others, new and old. New permanent workers appear to be similar to local residents in basic values and beliefs. This is consistent with numerous observations that mobile workers live in a world whose social structure is unique, leading to and allowing for unique value positions.

B. ECONOMIC EFFECTS

1. The Problem of Uncertainty for Small Businessmen

This is a pervasive problem that effects many components of social organization and impact mitigation. Most small-town businesses are financially fragile: if merchants borrow to expand and the growth doesn't occur or doesn't come quickly enough, owners can lose their livelihood. If these businessmen don't expand, they run the risk of being forced out by new, financially stronger competition, e.g., chain stores. They also get accused of not responding to local needs. If the businessman fortuitously implements his expansion correctly, he

may not have to raise prices to cover increased labor costs and the capital costs of expansion. But more often the expansion is not large enough, nor of sufficient duration for the businessman to recapture his investment without raising prices. Entrepreneurs who expand often get caught in the "bust" when growth declines.

How well the business community responds is, in part, determined by the structural problems just described, but is also affected by the level of cooperation in the community prior to development. If coordination and cooperation are good, businessmen will receive better help and at least better understanding from other local groups. If there is community conflict, businessmen may receive less information and help from others and may respond negatively, creating a split in the community which hinders management and coordination.

Uncertainty is one of the toughest problems in managing growth. Developers often aren't sure if their projects will be built. By the time they are sure, it's often too late for communities to plan effectively. If tentative plans are revealed, some groups jump in and make investments, and then blame the developer if the project doesn't go. Sometimes, when a company knows a project is going ahead, they can't convince local leaders or local groups until the lead time has been lost and growth is upon them. The problem of uncertainty was stressed in almost all of the studies.

2. Financial Institutions

The change in number, type, and ownership of financial institutions is significant where energy growth is significant. In one town, a new bank, a savings and loan company, and a financial

services office opened. In another, the one locally owned bank was purchased by non-local investors. In a third, a new bank and a new savings and loan company were founded. It is difficult to capture the full meaning of these changes. Some residents resent the changes in practices, while others feel they have become more fair. In general, rules and practices become more formalized and, therefore, probably more equitable. New procedures are established by outside holding companies and, consequently, the actions of the local institutions became more impersonal.

The effect of external ownership is difficult to evaluate in the short-run. In most instances, it appears that more total capital is made available for local uses, if borrowers can qualify and can afford the interest charges. However, it is too early to discern what the long-run effects of changes in ownership may be.

3. Increases in Per Capita Income

A general effect of development is an increase in per capita income as more people are employed at higher salaries. In almost every case, per capita income in energy growth counties was lower than or equal to the state average in 1970, but over half grew to nearly equal or exceed the state average by 1980. Undoubtedly, the increase in per capita income is not distributed equally in growth communities. Energy industry employees usually have higher per capita incomes than many other residents. Those on fixed incomes or employed in low-skill jobs do not appear to share in this general increase in personal income, but respondents indicate they believe that the majority of people are economically better off. One balancing factor is that

costs of living for many indigenous residents are lower. For many, their rents or mortgages were fixed before the growth and they already had many of the necessities of life which newcomers have to purchase upon arrival. Although no quantitative data are available to support this conclusion, wider distribution of employment (both construction and operation) among long time residents appears to occur in communities where energy development has the longest history, and is perceived to have a promising future.

4. Changes in Employment and Unemployment

Indications are that the level of "total" employment is generally high in the impact counties. But comparisons to state levels indicate that the "rate" of unemployment is often higher than state averages, and may even be higher in some impact areas than it was prior to growth. This latter fact may be caused by people coming to the area looking for work who are not well-qualified for the jobs available. Also, it appears that as growth tapers off unemployment goes up, representing a loss in material well-being.

Respondents in some communities, however, indicate that there was literally no unemployment among people capable of being employed, at least during the growth phase. The employment level among locals appeared to be virtually 100 percent.

In Colorado and Montana, a number of the unemployed were people who had fled the depressed areas of western Montana, Oregon, and Michigan. Some had just arrived and eventually found work, but others were not qualified for high-paying energy jobs. Most who do not find work were reported to leave after a short period of time.

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5. Effects on Community Facilities and Services

In all communities where growth is large, facilities and services are either overloaded or at maximum use during the peak period. Immediately following the peak most services and facilities are more satisfactory, even under-used. Providing an adequate supply of services and facilities is difficult for all growth communities. A major problem is finding front-end financing, especially for city services--sewer, water and streets. Normal revenue sources are inadequate in all rural, Western communities. Rapid growth can only be accommodated if non-normal revenue sources are found for city services and facilities. A second problem is uncertainty. In only two cases were services and facilities expanded before demand exceeded supply, and even then those expansions were not across-the-board. Uncertainty makes developers reluctant to make grants or loans available before the fact. Elected officials are reluctant to incur debt before the demand is clearly present. But the lead time necessary for most facilities is so long that if risks are not taken, there will be a period when demand exceeds supply. Thus, the provision of services and facilities is not just a dollars and cents problem, it is a social problem of coordination and psychological evaluation (risk taking).

The second component to providing services and facilities is clearly a social organizational problem, and it has many dimensions varying among communities. As illustrated numerous times, provision of services and facilities is highly dependent on the level of cooperation in a community (integration) and the coordination of the

community with the developer. If power is held by a few and those few oppose development, planning for new services may be delayed and severely hampered. If city and county governments don't cooperate well, then service financing and delivery is more difficult.

It is obvious that having adequate or surplus services and facilities helps to mitigate the negative effects of development. Specifying adequate levels/numbers of services and facilities is rather simple (i.e., number of policemen needed, number of hospital beds, etc.). What is complex are the social interactions which must occur to provide the needed services and facilities. Thus, SIAs need to do more than forecast the level of services and facilities which will be needed. They need to address the social question of whether these services and facilities will be provided in the proper time frame.

C. POLITICAL EFFECTS

1. Increases in the Number, Type and Frequency of Connections Between Governmental Levels and Between Government and the Private Sector

Evidence from the BLM case studies suggests that the number and type of connections among groups, both public and private, increase dramatically when level of development increases. Local rural communities appear quite adept at developing connections to external sources of resources when the need arises, and when development provides them with an initial source of new resources to initiate such contacts. A major effect has been to reduce the isolation of rural communities, increasing their integration with the larger society. It

is not clear whether this increase in political activity and connections will result in some permanent level of increase in such activity when development declines.

There may be little reason for such activity to continue after development ceases because local actors will be of less interest to external groups. But because locals have learned how to make such connections, and because social relations can have a "life of their own", it is not clear how these connective activities do change post-development. Clues to the answer should be contained in historical accounts of prior growth periods.

2. The Loss of Local Autonomy

Several studies have expressed the belief that energy development would result in domination of local communities by external actors (Gold, 1974; Cortese and Jones, 1977). The predominance of evidence from the BLM case studies is that such dominance has not occurred. It appears that local officials have been able to use state and local laws and regulations to retain significant local control over developments. Further, the focus of local elective power appears to have changed little. The major changes in local government appear to have been an increased degree of specialization and professionalism for appointed administrative functions. Elected officials were predominantly long-time residents drawn from the same social status as they had been historically.

Social Well-Being Effects

The effect of energy development on individual and community

well-being has been a major focus of many WSIAs. This is partially so because of the emphasis placed on well-being in the more prominent conceptual frameworks suggested for SIA (Finsterbusch, 1980; Finsterbusch and Wolf, 1981). It is also true because of the implicit and explicit concern with quality of life expressed in NEPA (1979). The boomtown studies in the Western coal region describe a host of negative changes in individual well-being, including increased rates of divorce, crime, suicide, alcohol and family violence (see Wilkinson et al., 1982 for an extended discussion). A major problem with this approach is that it is difficult to measure changes in individual well-being and even more difficult to establish cause and effect relationships. Thus, there has been considerable debate about the actual effects on individual well-being resulting from energy development. The USGS project cited at the beginning of this section was designed in part to test the more prominent negative effects on individual well-being described in the "boomtown" literature, e.g., increases in divorce, crime and suicide, and to develop a more adequate framework for conducting WSIAs. Review of the divorce and crime analyses from this project reveals some of the problems with the individual well-being approach, and suggests why a broader framework, as partially developed in this paper, may be more useful for the policy purposes of SIAs found in Environmental Impact Statements and similar documents.

In a paper entitled "Divorce and Recent Net Migration Into the Old West" (Wilkinson et al., 1983a) the relationship between rapid population growth and divorce due to energy development was tested.

Data on change in divorce rates of 292 counties in the Old West Region from 1970 to 1975 were examined using multiple regression techniques. Simply stated the findings were that net inmigration had little influence on changes in divorce rates of these counties during the period studied. As stated in the article, these findings do not mean that the disruption hypotheses in the boomtown literature were disproven, but it does suggest that the observations from the boomtown articles should be treated only as suggestions and not as conclusions that can be used to inform policy decisions.

The major policy implication of the report is that it cannot be assumed that divorce increases as a result of population growth due to energy development. The findings suggest that small rural communities experiencing energy development may be able to absorb growth through net inmigration without disruption of basic social institutions.

In a related article, "Violent Crime in the Western Energy-Development Region", (Wilkinson et al., 1984) an analysis similar to the divorce analysis was conducted. The boomtown studies coupled with the theory of social disorganization predict positive effects of energy related growth on the violent crime rate in small towns and rural areas. Using data from the Uniform Crime Reports of the FBI and reports by the U.S. Bureau of the Census and other federal agencies on 197 non-metropolitan counties in the Western coal region, regression techniques were used to test this relationship while controlling for three categories of control variables--urbanization, socioeconomic characteristics and cultural characteristics. Change in the violent crime rate was examined for the period from 1970 to 1978

to identify the incremental change in the crime rate due to recent growth and energy development.

The results of the analysis do not support the interpretation of the social disorganization theory as the theory has been used in the boomtown studies. The findings suggest that prior structural and historical conditions provide a better explanation of variation in the violent crime rate than does energy development in the 1970s. Where various environmental conditions--including the natural environment and relationships to the larger society--contribute to long range problems of community adaptation, the effects of these problems on the violent crime rate tend to be lasting, and the effects of short-run changes tend to be modest. These conclusions illustrate the importance of including historical factors in the analysis of the social effects of energy development.

While the above examples represent only two of many possible effects on individual well-being, they illustrate the complexity involved in studying such effects. The state of the WSIA literature is that there is a great deal of speculation about effects on individual well-being but few analyses sufficiently rigorous to inform policy analyses. In our opinion, well-being can best be addressed in a broader framework, such as that expressed in Figure 2. The evidence from both the BLM case studies and the articles from the USGS research project is that the effects of development vary significantly depending on historical experience, ethnic composition and social organization of local communities.

Summary

Most of the empirical findings reviewed in this section indicate that the effects of energy development vary significantly from community to community. It is the unique interaction of the components in Figure 2 for each community that determine the majority of outcomes.

The ecological requirements for the region--reserve capacity, flexibility and mobility--joined in an interaction matrix with historical and ethnic characteristics offers an analytic framework within which effects can be better interpreted and understood. Such a perspective also may be able to provide the generalizability which is presently missing in SIAs in this region.

The concept of mobility helps to explain many of the problems of labor supply and of provision of public services and facilities described above. Mobile labor forces are necessary to develop the natural resources of the area and always have been. It is inherent in the ecological characteristics of the area that most types of economic development in this region require a workforce that can be moved in and out in short time periods (from annually to two to ten year periods). Thus the needs and effects of these mobile workforces need to be analyzed and understood as a naturally recurring social phenomena dictated by the physical environment. The history of the region is a sad tale of the use and abuse of successive generations of mobile workers. There is remarkable similarity in the way the current oil and gas workers are abused to the way previous generations of mobile Indians, Chinese and Mexicans were treated.

The problems of providing public facilities and services are related to the need for mobile workers. These services must be expanded and contracted with the development cycle. Yet much of the region persists in building and financing facilities and services as if they were located in the more humid and stable regions of this county. With a little imagination it is easy to see how most of the above described empirical findings can be interpreted or understood as fulfilling or failing to fulfill one or more of the the three ecological requirements (mobility, flexibility and reserve capacity). When these ecological considerations are overlain with the ethnic and historical characteristics of local communities we believe an approach emerges which offers greater understanding and which can led to improved policies for managing and mitigating the effects of development.

In the next section we articulate some general observations on energy development and suggest the research activities which we believe would improve the Western assessment effort.

IV. OBSERVATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Observations

In formulating the following observations we go beyond the data presented above, drawing upon our total experience--working in this region over the past ten years.

1. Evaluated from the historical-ecological perspective, the energy boom of the 1970s is consistent with the historical patterns of the region. This latest period of boom-bust appears to have differed only in scale from the period of agricultural and mining growth that have filled the history of the region since the late 1800s.

Given the environmental constraints of this region--semi-aridity, space, and limited resources--and the current structure of national and international social organization, the region will simply not support sustained growth and development in many locations. Sustained growth may occur in a few locations, including a few energy sites such as Rock Springs and Gillette, Wyoming, but not in most places that grew from energy development in the 1970s. A central-place analysis of the entire region would probably be able to identify these few potential growth centers mainly as places that produce goods and services for the region, and not as places that serve national or international energy markets.

Most communities in the region will continue to have small, residual and highly resilient populations comprised of tough, cagey prospectors, ranchers and farmers, retail merchants, a few professionals, and various small entrepreneurs. This conclusion is

not new, but the materials that support it are scattered among disciplines and geographical locations. The wiser and more observant residents of the region knew this when the latest development began.

But the historical pattern of development, boom and bust, inmigration and outmigration, and the specific social trends it embraces largely escaped formal social assessments. Further, the particular social roles, and organizational and institutional structures and processes which have evolved during this historical transformation are not explicitly and generally known and studied. In short there is a specific sociology of this region which we suspect is similar to other arid and semi-arid regions. There is much evidence of it, there have been attempts at a sociology of the region which we cited above. A review of the WSIA literature shows that with this latest effort at analyzing change in the region most analysts were slow in recognizing that there is a distinct social patterning here. The WSIA effort has not been in vain, however. It contains new evidence of the pieces of the sociology of these lands. But it needs to be recognized that there is a distinct animal here--a specific sociology of arid and semi-arid lands--that needs to be formalized and developed. One of the trends of the region is the bursts in social analysis which emerge with growth periods, only to wither away when the booms subside. A major need is to find the resources to continue such study as this latest boom fades. This is an appropriate task for the land grant universities of the region--one which regularly gets shunned by the very people who stand to gain the most from its development.

2. On a less global level, there is clear evidence that most of the energy communities go through a period of significant social disruption or "social disorganization". As Albrecht (1982) has correctly noted, social disorganization is not fixed, but is a fluid process and therefore, the social changes a researcher observes are highly dependent on the time in which he makes his observations. The case study evidence indicates practically every community experienced a period of social disorganization. But the evidence is unclear as to the extent and effect of such social disorganization, and the courses of such disorganization are poorly described and explained.

A closely related problem is the overattention in this literature to social pathologies attributed to development, implicitly assuming a relation between social pathologies and social disorganization. The claims that social disorganization causes social pathologies has produced a methodological-measurement debate that, while interesting from a scientific standpoint, contributes little to our understanding of the problem of coping with rapid growth in rural areas. Clarification of the social disorganization question requires data from a well-executed longitudinal, comparative case study.

3. The evidence is very clear that sudden, massive growth in small rural communities usually results in a shortage of housing and most public and private services. This engenders widespread inconvenience and considerable distress.

But it is also evident that the response by communities varied considerably with extensive variance in results. Research needs to focus on the variables which produce these differences which appear to

include the size of a project, the corporate philosophy of the project developer and local community organization processes.

4. Uncertainty was identified as a major problem impeding the ability of local governments and entrepreneurs to respond in time to increased demands for goods and services. The specific components of uncertainty need to be better explicated, and means for resolving such uncertainty need to be investigated.

5. The itinerant worker and his family are related to a majority of the social problems related to energy development. These individuals appear to be the major victims of development. Further, their plight in the region appears to be simply symptomatic of a growing national problem--the problem of the invisible unemployed, the permanently dispossessed in an increasingly bureaucratic society. We believe finding solutions for this group is a major key to better mitigating the effects of development. We think the number one research priority should be better understanding of this "subculture", and the improvement of its adherents social welfare. Achieving this goal will indirectly solve many other perceived development problems.

6. The inevitability of "the bust" portion of the cycle and its effect on local communities has been almost totally ignored in social assessments to date. This has been true historically. When the periodic booms stop, local resources evaporate almost overnight and there is little documentation of the mechanics of the bust period. It is occurring with significant effect today in this region and yet we can document only a few sponsored studies of this process, e.g., an analysis of Bisbee, Arizona's bust experience is contained in a report

by Ecos Management Criteria, Inc., The Validation and Improvement of Socioeconomic Forecasting Methodologies, Vol. I and II, U.S. Geological Survey, Reston, VA, June, 1982.

Recommended Research

As we stated in the introduction, our goal has been to decipher efficient research strategies which could quickly bring order to the WSIA data base to render it more useful to policy decisions. The above review demonstrates that the existing research on the region (both from SIAs and other sources) is diverse and extensive. But there are several critical deficiencies which make it difficult to integrate this information into a rigorous, cohesive whole which can support policy decisions. First, there is the absence of comparative community studies which can clarify why development inputs have such different effects in the numerous ecologically distinct sub-regions which compose this area. Second, is the lack of time-series community data which could explain the processes of social organization/disorganization which accompany the cycles of boom and bust which are endemic to the region. Finally, there is the need for methodologically appropriate analyses addressing changes in individual and community well-being. We think that two well organized research efforts could transcend much of this impasse in a short time frame, transforming the existing data base into an usable basis for policy decisions. These two efforts, described below, are possible at this time because of the presence in the region of knowledgeable and

experienced researchers, trained in large part by the SIA efforts of the past decade.

1. A comparative, longitudinal case study (or studies) should be organized immediately. It should include at least four development communities and two control communities and should contain the following components--an expanded review of the existing literature on the region; identification of key social effects; and development of appropriate methods and techniques for measuring these effects both retrospectively and prospectively. We think the following dependent explanatory variables and hypotheses should be part of such a study.

Dependent Variables:

a. Adequacy of housing and services and facilities during the period of peak growth.

b. Distribution of benefits/costs during the growth period.

c. Effects of post-development (bust) period.

Explanatory Variables

a. Magnitude of growth (project inputs).

b. Action and interaction of:

- local leaders, agencies and firms
- energy development agencies and firms
- state and local governments

c. Ecological constraints of the region

d. Ethnic and historical evolution in the region

Hypotheses to be Tested

a. Do variations in growth management affect trends in rates of social problems?

b. Do variations in patterns of historical adaptation influence the effectiveness of growth-management efforts?

c. Do the effects of energy development differ substantially from the effects of other kinds of development?

d. Are the ecological requirements posited in this paper -- reserve capacity, flexibility and mobility -- explanatory characteristics of semi-arid and arid regions such as this one?

We suggest two such studies, conducted separately, would produce the most accurate results. One study group should be organized by the land-grant universities using only state, private and regional funds. The other group could possibly be funded by federal agencies since the results would have profound significance for rural development both domestically and abroad. If successful, this study could be extended to become cross-cultural after a few years.

2. The second research project we recommend is a thorough study of itinerant workers. This should be a national study, examining all aspects of this sub-group as it occurs in all parts of this county. Given the extreme plight of these people as we have observed them in the Western region, we believe this topic should be the subject of a presidentially appointed study commission.

FOOTNOTES

(1) As used in this paper the Western energy states include parts of Montana, Wyoming, North Dakota, South Dakota, Nebraska, Utah, New Mexico and Arizona

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